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2.0 ALTERNATIVES

2.1 Overview

The purpose of this section is to present a reasonable range of alternatives developed to meet the purpose of and need for the project. The alternatives description is intended to provide decision makers and the public a clear basis for choice among the alternatives. This EIS/EIR considers three build alternatives, identified as Alternatives A, B, and C, and a No Action alternative (Alternative D). Also provided is a discussion of those alternatives eliminated from detailed study. Chapter 3 provides a detailed comparative analysis of the impacts and appropriate mitigation measures, where required, for each alternative considered.

Bautista Canyon Road north of the project limits, from Valle Vista to the Conservation Camp, consists of a 2 lane, winding, paved road through rolling terrain. The road width typically ranges from 24 to 28 feet in width with the pavement condition being in fair to poor condition. The design speed of most of the roadway is in the range of 25 to 35 mph but contains multiple curves that do not meet the requirements for those design speeds. There is one vented low water crossing of Bautista Creek.

Bautista Canyon Road south of the project limits, from the southern project limit to route 371 in Anza, consists of a 2 lane paved road through flat terrain. This roadway has only one horizontal curve, consisting of a ninety degree turn with a radius lower than the AASHTO criteria for a 15 mph curve. The road width typically ranges from 22 to 26 feet in width with the pavement condition being in fair to poor condition. There are multiple residential driveways along this section of roadway.

The proposed Alternative A, B, and C alignments vary depending upon the proposed design speed and alignment variations developed to avoid or minimize impacts to environmental resources. The three build alternatives were selected for further analysis because they best balance competing concerns by meeting the project objectives while minimizing environmental impacts. Alternative D is included in this document to comply with NEPA (§ 1502.14[d]) and CEQA Guidelines (§ 15126.6[e]), which require the evaluation of impacts associated with a no action alternative. The purpose of the no action alternative is to provide decision makers a benchmark to compare the magnitude of environmental effects associated with implementation of the proposed action alternatives.

2.2 Alternatives Considered in Detail

The alternatives were developed to satisfy the purpose of and need for the project and meet the following objectives:

- Improve safety
- Provide a continuous paved surface
- Widen the roadway to provide functionally adequate travel way and shoulders

- Realign the roadway to remove sharp turns and abrupt vertical curves in order to improve sight distance.
- Reduce travel time between SH 74 and SH 371
- Provide superelevation and provide a more uniform travel speed
- Realign and raise the roadway grade along Bautista Creek to move it out of the 100-year floodplain
- Replace deteriorating and/or insufficient drainage culverts
- Add additional drainage culverts at existing low water crossings
- Provide a parking area for the Alessandro Trailhead
- Provide a parking area and interpretive site in Bautista Canyon
- Improve access efficiency for all users
- Reduce travel time between SH 74 and SH 371
- Reduce maintenance costs and needs
- Reduce fugitive dust emissions
- Add a bridge crossing over Bautista Creek, and
- Improve emergency vehicle access to Bautista Canyon.

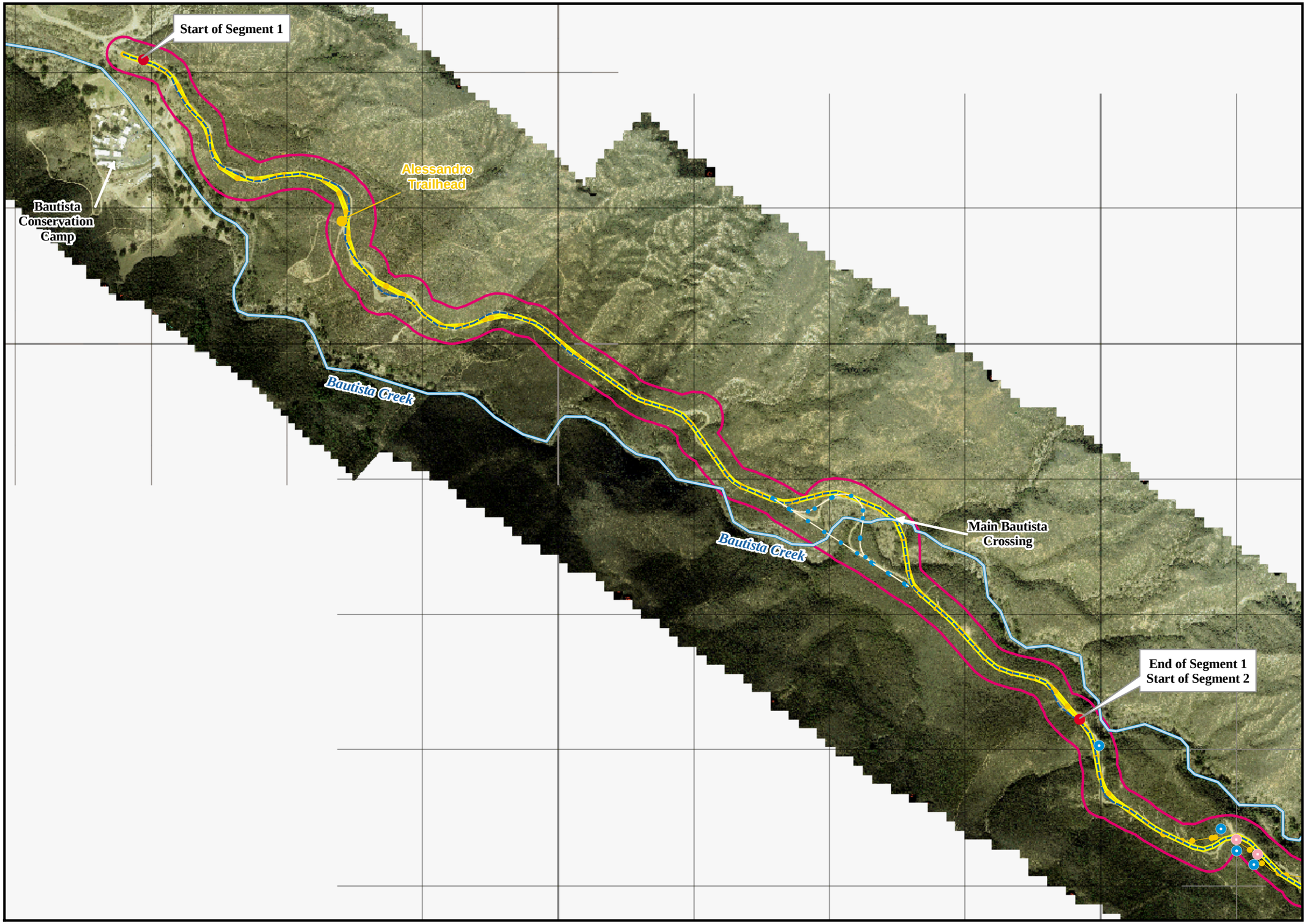
As noted, the project study area is comprised of the unpaved segment of Bautista Canyon Road. The study area ranges in elevation from 823 to 1,219 meters (m) (2,700 to 4,000 feet [ft]). The length of the project [approximately 13.2 km (8.2 mi)] is broken up into three segments based on the existing terrain. Segment 1 [5.0 km (3.1 mi)] consists of rolling terrain. Segment 2 [5.3 km (3.3 mi)] consists of mountainous terrain, while Segment 3 [2.9 km (1.8 mi)] consists of flat terrain. The project segments are shown in Figures 2.2-1 through 2.2-3 and are described as follows:

- **Segment 1 (rolling):** The northernmost 5.0 km (3.1 mi) section of the route traverses gently rolling top-of-ridge or hillside terrain. This segment also crosses several drainages, including Bautista Creek.

- **Segment 2 (mountainous):** The central segment extends from the end of Segment 1 approximately 5.3 km (3.3 mi) to approximately 1,000 m (3,300 ft) south of the Tripp Flats Road intersection. This segment traverses fairly difficult, predominantly side-hill terrain and crosses several drainages, including Bautista and Cottonwood Creeks.

- **Segment 3 (gentle):** The southernmost 2.9 km (1.8 mi) section traverses gentle side-hill or alluvial fan terrain and crosses Bautista Creek about 250 m (825 ft) north of Howard Road.

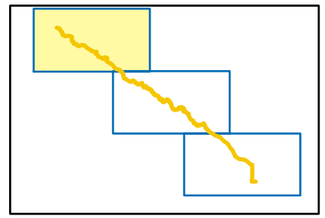
As discussed, Alternatives A, B and C have varying alignments based on proposed design speeds. Alternative C has been designated as the preferred alternative. Under alternative C, the design speed varies depending on topography. These design considerations are intended



Legend

- Existing Pole Locations
- Relocated Pole Locations
- Alternative A (40 km/h)
- Alternative B (55 km/h)
- Alternative C (55/40/55 km/h)
- Eliminated Alternatives (Ridge # 1)
- Bautista Creek
- Study Corridor

Map Sheet Index



MAP NOTES:
Projection- CA State Plane, nad83, zone 6, meters

DATA SOURCES:
FHWA- Road alignments, 2001 aerial imagery
Existing/Proposed pole locations
AMEC- Species points, Study corridor
Vegetation communities, Water and Wetlands
USFWS- Critical habitats

Meters

0 500

Project Alternatives

FIGURE
2.2-1

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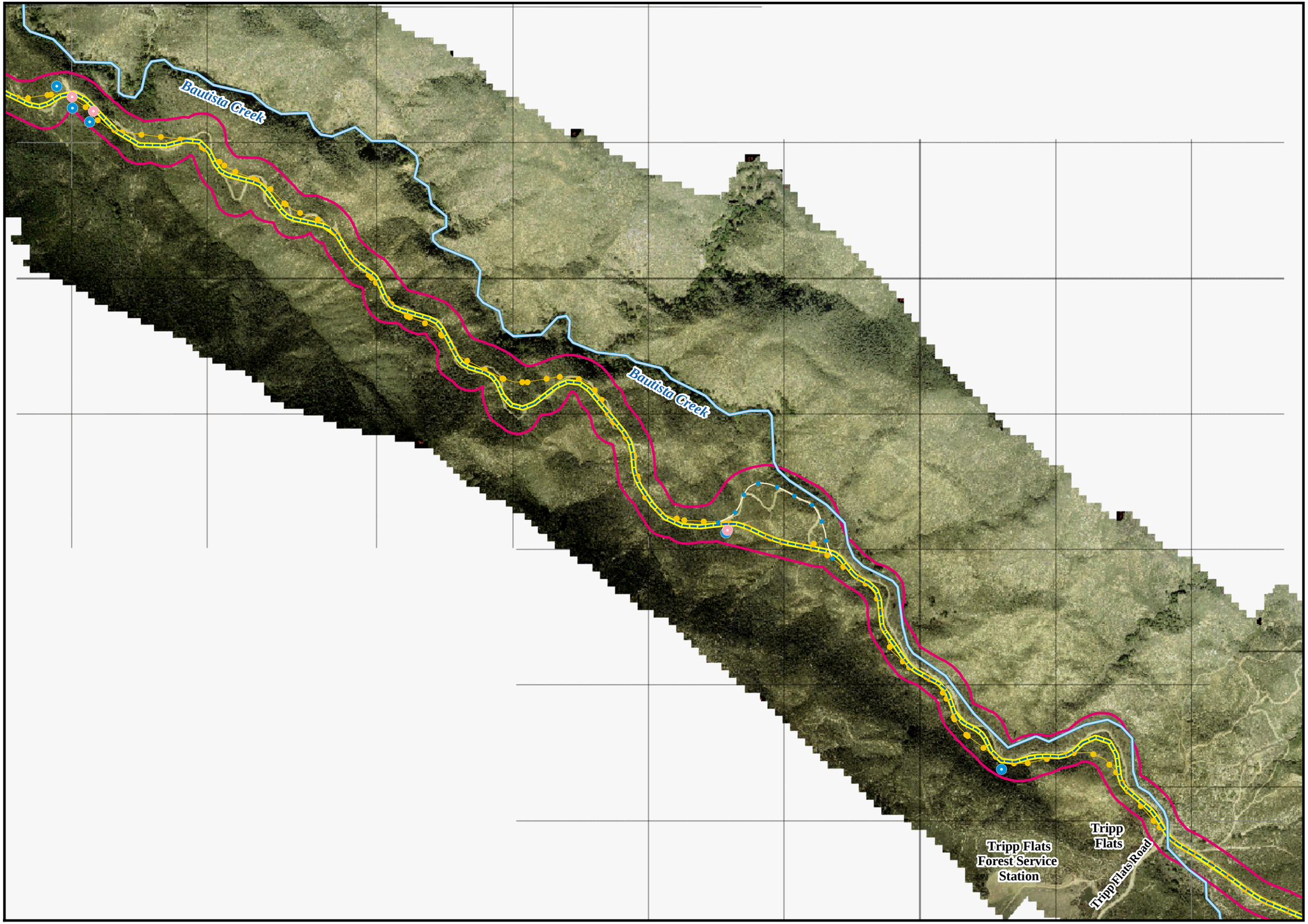
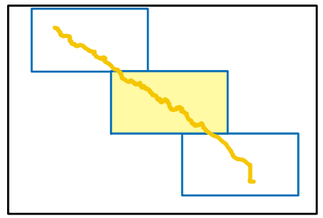


Legend

- Existing Pole Locations
- Relocated Pole Locations
- Alternative A (40 km/h)
- Alternative B (55 km/h)
- Alternative C (55/40/55 km/h)
- Eliminated Alternatives (Ridge # 2)
- Bautista Creek
- Study Corridor

Map Sheet Index



MAP NOTES:
Projection- CA State Plane, nad83, zone 6, meters

DATA SOURCES:
FHWA- Road alignments, 2001 aerial imagery
Existing/Proposed pole locations
AMEC- Species points, Study corridor
Vegetation communities, Water and Wetlands
USFWS- Critical habitats

Meters
0 500

Project Alternatives (Continued)

FIGURE
2.2-2

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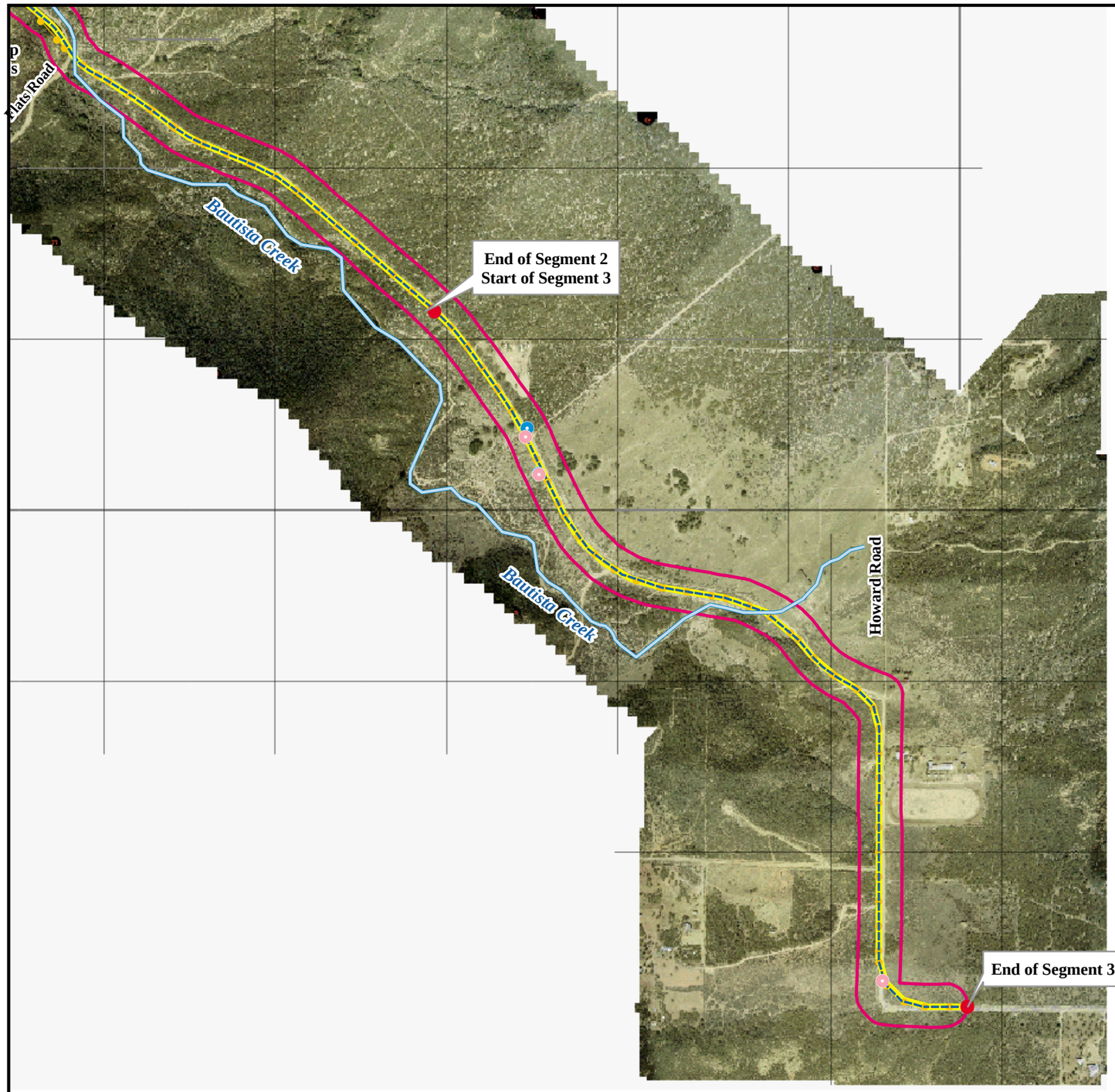
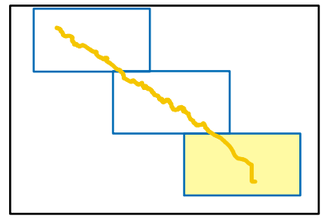


Legend

- Existing Pole Locations
- Relocated Pole Locations
- Alternative A (40 km/h)
- Alternative B (55 km/h)
- Alternative C (55/40/55 km/h)
- Bautista Creek
- Study Corridor

Map Sheet Index



MAP NOTES:
Projection- CA State Plane, nad83, zone 6, meters

DATA SOURCES:
FHWA- Road alignments, 2001 aerial imagery
Existing/Proposed pole locations
AMEC- Species points, Study corridor
Vegetation communities, Water and Wetlands
USFWS- Critical habitats

Meters
0 500

Project Alternatives (Continued)

FIGURE
2.2-3

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to maximize the functionality of the proposed roadway while minimizing adverse environmental effects.

2.2.1 Design Criteria Common to All Build Alternatives

2.2.1.1 Design Standards

Design criteria used for the build alternatives were developed using AASHTO, CFLHD, USDAFS, County of Riverside, and Caltrans standards. FHWA has approved and adopted AASHTO and state (Caltrans) standards for public lands highways such as Bautista Canyon Road. FHWA can approve lesser standards for specific projects when appropriate. CFLHD has developed guidelines for consideration in environmentally sensitive locations where adherence to the approved standards would create unacceptable environmental impacts and approval of a less restrictive standard can be justified as an exception. Table 2.2-1 summarizes the design standards established for this project. A design exception will be needed for standards used that do not meet the AASHTO criteria. In most cases, these standards still meet County of Riverside and/or CFLHD criteria. Design standards are described as follows. Standards requiring design exceptions are noted.

Table 2.2-1
Design Standards

Standard	AASHTO	CFLHD	Caltrans	Standard Used
Design Vehicle	N/A	N/A	N/A	Single Unit Truck
Design Speed	Rolling – 60 km/h minimum; Mountainous – 50 km/h minimum	N/A	60-80 km/h	40 km/h 55 km/h
		Cross Section		
Travel Lane Width	40 km/h – 3 m minimum; 60 km/h – 3.3 m minimum	3.3 m minimum	3.6 m minimum	3.3 m
Shoulder Width	1.5 m minimum	40 km/h – 0.3 m minimum; 60 km/h – 0.6 m minimum	0.6 m minimum	0.6 m
Offset to Guardrail	50 km/h – 1.1 m 60 km/h – 1.4 m	40 km/h – 0.9 m 60 km/h – 1.2 m	1.2 m	1.2 m
Roadway Cross Slope	2% minimum	1.5 % to 2%	2%	2%
Maximum Fill Slope Ratio	N/A	N/A	N/A	1(V):1.5(H) maximum; 1(V):2(H) desirable
Maximum Cut Slope Ratio	N/A	N/A	N/A	2(V):1(H) maximum (rock); 1(V):2(H) desirable
Foreslope Width (225 mm Depth Pav't)	N/A	40 km/h 0.9 m 60 km/h 1.125 m	N/A	1.2 m

Standard	AASHTO	CFLHD	Caltrans	Standard Used
		Horizontal		
Minimum Radius	40 km/h – 55 m 55 km/h – 110 m	N/A	40 km/h – 70 m 60 km/h – 150 m	40 km/h – 55 m 55 km/h – 125 m
Maximum Superelevation	12%	8%	12%	6%
		Vertical		
Maximum Grade	40 km/h – 10%/11% (Rolling/Mountainous); 55 km/h – 8%/10%	N/A	Rolling – 5% Mountainous – 7%	11%
Stopping Sight Distance (Grades < 3%)	40 km/h – 50 m 60 km/h – 85 m	40 km/h – 44.4 m 60 km/h – 84.6 m	40 km/h – 50 m 60 km/h – 85 m	40 km/h – 50 m 55 km/h – 75 m

The standards used for this project were selected based upon the following factors:

Design Vehicle – As noted in Table 2.2-1, a single unit (SU) (two axle) truck design vehicle was selected. Based on traffic counts taken in April 2002, only 0.6% of traffic volumes north of the Conservation Camp were double unit (semi) trucks (i.e., wheel base greater than 50 ft). These trucks were assumed to access the Conservation Camp and then return to the north, as no double unit trucks were recorded south of Tripp Flats Road. Selection of the SU design vehicle is intended to minimize environmental impacts. Relative to a double unit truck, the curve radii needed to accommodate a SU design vehicle are smaller; thus, less environmental disturbance would be necessary to meet the project's purpose and need. It is anticipated that a very low volume of vehicles larger than an SU vehicle would use this route. Vehicles larger than the SU may slightly encroach upon the opposite lane or off-track on the inside of tight curves. The County proposes to restrict larger vehicles on this road using signage at both logical termini and at appropriate locations along the route.

Design Speed – A minimum design speed of 50 km/h (30 mph) in the mountainous sections (segment 2) and 60 km/h (37 mph) in the rolling sections (Segments 1 and 3) is recommended by AASHTO. Based on projected roadway use and environmental considerations, the SEE Team agreed that this roadway would be designed using 40 to 55 km/h (25 to 35 mph). A design exception would be required.

Travel Lane Width – A travel lane width of 3.3 m (11 ft), as recommended by AASHTO and CFLHD, would be used for this project.

Shoulders and Roadside Treatments – A shoulder width of 0.6 m (2 ft) would be used for this project. In areas that require a guardrail, this width would be increased to 1.2 m (4 ft) to account for the AASHTO recommended shy distance. AASHTO recommends a 1.5 m (5 ft) shoulder width, but, due to an increase in environmental impact and FHWA's experience with rural two-lane highways in this type of setting, it was determined that a design exception would be applicable. Because the travel lane width, which is most influential when considering safety, was not reduced below the recommended criteria, the effect on safety associated with reducing the shoulder width was acceptable in comparison to the degree of environmental impact avoided. Paved ditches will be constructed on grades steeper than 4% to reduce soil erosion.

Maximum Fill Slope Ratio – A maximum fill slope ratio of 1 vertical (V):2 horizontal (H) would be used in most locations. This is the maximum slope that would allow revegetation. A fill slope ratio of 1(V):1.5(H) could be revegetated using erosion control measures and a more complicated, time-consuming, and expensive revegetation process. This slope ratio would only be used in areas where the reduction in impacts would justify the increased effort and cost to revegetate the slope. For this project, 1(V):1.5(H) slopes would be used in areas with long fill slopes that have approximately the same or flatter slopes than the existing ground, and where increasing the slope to 1(V):1.5(H) would significantly reduce the area of disturbance.

Due to the existing and projected roadway characteristics, such as low traffic volumes [e.g., 361 ADT existing; 1,790 ADT projected for design year (2025)], low speeds [project design speed of 40 to 55 km/h (25 to 35 mph)], mountainous terrain, and the desire to maintain a natural canyon setting, all of the roadside safety hazards related to fill slope stability would be evaluated on a case-by-case basis. In cooperation with the County of Riverside and the USFS, FHWA will develop project specific safety concern guidelines. In areas that appear to have a high potential of being a safety concern based on the guidelines, the following three options will be evaluated:

1. Remove or reduce the hazard so that it is no longer a safety concern (flatten slopes, remove obstacles, provide adequate clear zone).
2. Provide safety mitigation by installing guardrail.
3. Leave the hazard unshielded, but use signing or delineation.

Maximum Cut Slope Ratio – Based on the Interim Geotechnical Report (CA-FX-0224-03-01) (Volume II, Appendix J), various maximum cut slope ratios would need to be used depending on the soil characteristics. For areas with alluvial soil, a maximum slope of 1:1 can be used, although a 1(V):2(H) slope is preferred for revegetation purposes. In areas of rock, a maximum slope of 2(V):1(H) would be used.

Minimum Radius – The minimum horizontal radius used for this project would be 55 m (180 ft) for 40 km/h (25 mph) sections and 110 m (361 ft) for 55 km/h (35 mph) sections. This is based on AASHTO recommendations for a maximum superelevation of 6%.

Maximum Grade – The maximum grade used for this project would be 11%. The 11% grade would be limited to short segments to reduce the effect on travel speed and safety.

Stopping Sight Distance – The stopping sight distance used for vertical and horizontal curves and intersection designs would be 50 m (164 ft) and 75 m (246 ft) for 40 km/h (25 mph) and 55 km/h (35 mph), respectively. The stopping sight distance would be adjusted for grades over 3%.

2.2.1.2 Speed Limits on Bautista Canyon Road

Bautista Canyon Road currently does not have a posted speed limit. Where the design speed of the road is 25 mph (40 km/h), the County would install 25 mph (40 km/h) limit signs. On the

proposed paved Bautista Canyon Road, the County would install 35 mph limit signs for both the northbound and southbound direction where the design speed of the road is 35 mph (55 km/h).

2.2.1.3 Center Line Striping

After the proposed paving is complete, double yellow centerline and white edge lines would be installed on Bautista Canyon Road starting from Fairview Avenue, including the newly paved portion, and ending at SH 371. The centerline line and edge lines would provide orderly flow of traffic from opposite directions, and better nighttime guidance for traffic.

2.2.1.4 Truck Prohibitions and Sign Placements

As noted, one purpose of the proposed action is to improve the safety of an existing unpaved County road. To maintain safety after project completion, through truck traffic of a certain weight would not be allowed on the newly paved segment. SU trucks would be the largest vehicles allowed on Bautista Canyon Road. The County intends to install signs at the beginning of the limits of the proposed project to prohibit commercial vehicles with a gross weight of 7 tons or more. Advance warning signs at strategic locations, including Fairview Avenue at Mayberry Avenue for southbound traffic, and Bautista Canyon Road north of SH 371 for northbound traffic, would also be installed.

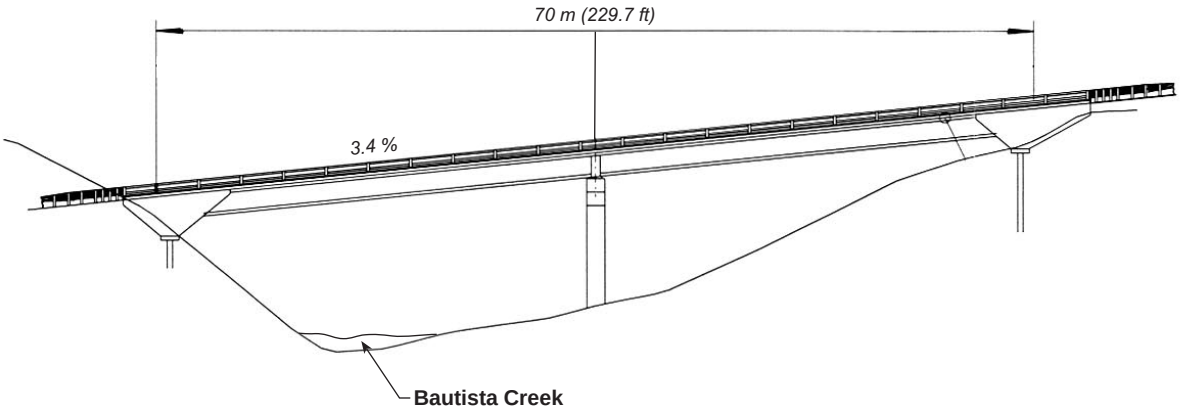
2.2.1.5 Drainage

The main Bautista Creek crossing is located approximately 3.0 km (1.9 mi) south of the northern terminus. Under the build alternatives, Bautista Canyon Road would cross the creek via a 70 m long and 9.9 m wide (229.7 ft by 32.7 ft), two-span bridge. The height of the bridge would be a minimum of 4.3 m (14 ft) above the creek bed. A typical bridge cross section is shown in Figure 2.2-4. The purpose of the bridge would be to provide adequate hydrologic clearance for the reconstructed road, reduce resource impacts resulting from fill placement, and accommodate wildlife passage. The bridge would be designed as an all-weather crossing capable of withstanding a 100-year flood event.

The project would also require the installation of culverts where the roadway crosses existing creeks or other natural drainages, and for storm drainage. To comply with SBNF design criteria, culverts would be designed to accommodate a 50-year flood event. The minimum culvert size is proposed to be 0.6 m (2 ft) in diameter. Four culverts have been identified that may be conducive to wildlife passage and would be designed for both hydraulic requirements and wildlife movement.

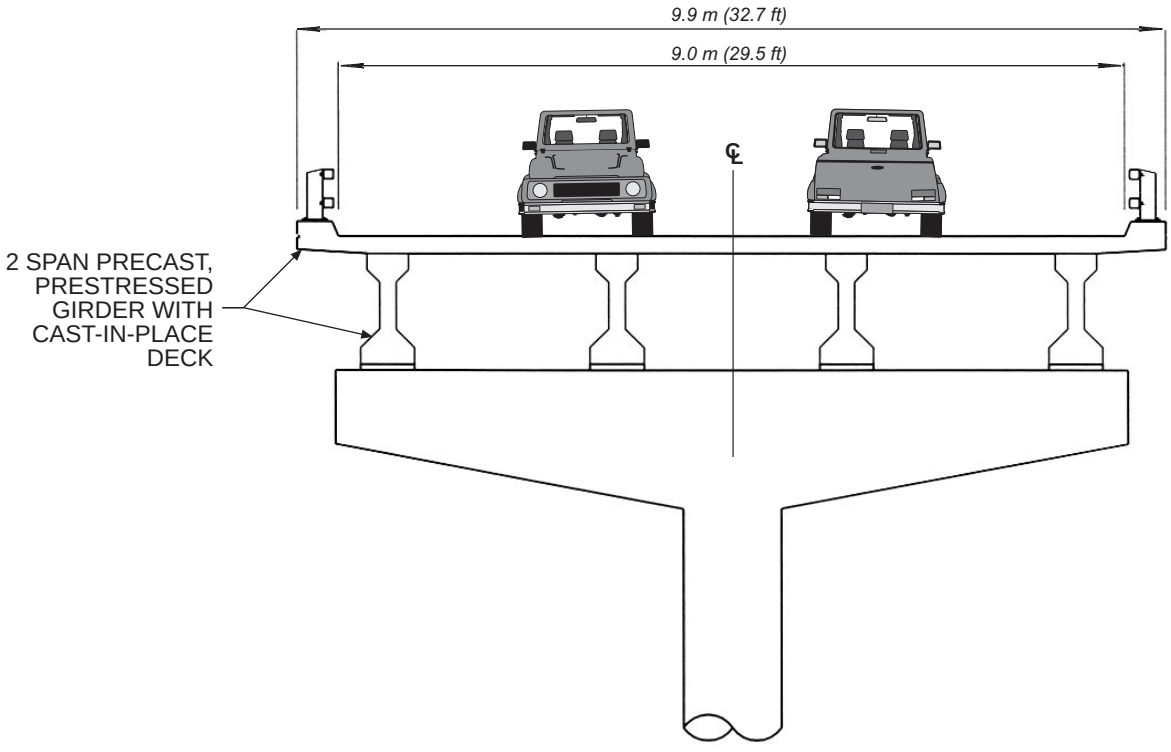
2.2.1.6 Bautista Canyon Overlook

A 0.1 ha (0.3 ac) interpretive overlook area is proposed on a point overlooking Bautista Canyon approximately 5.5 km (3.4 mi) south of the northern terminus. The conceptual design includes a pullout area with parking for five vehicles and a pathway to the overlook area. An interpretive display (see Figure 2.2-5) describing historical use of the canyon by Native Americans, and use of the canyon as a travel corridor for Juan Bautista de Anza would be provided at the overlook



PRELIMINARY
TYPICAL BRIDGE SECTION (SIDE VIEW)

ELEVATION



PRELIMINARY
TYPICAL BRIDGE SECTION

SOURCE: FHWA 2003

Bautista Canyon Typical Bridge Section

FIGURE
2.2-4

GRAPHICS/Environmental/Typical Bridge Section_a.fh8

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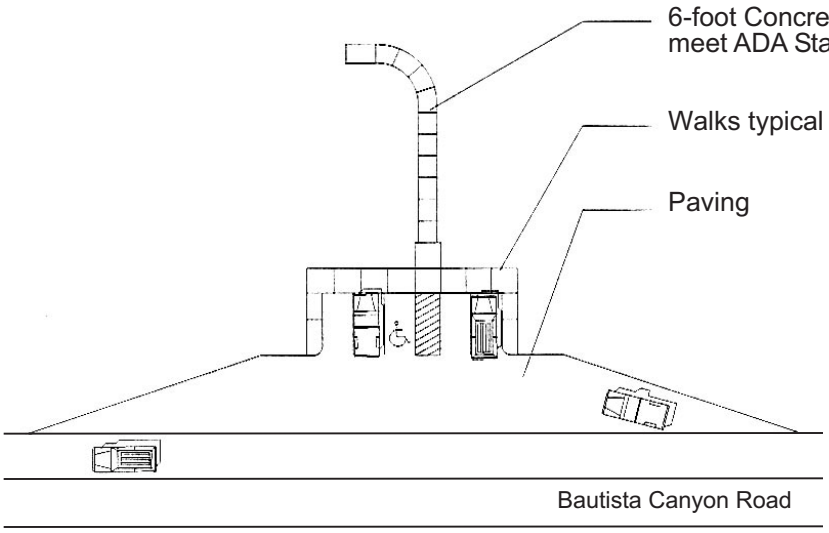
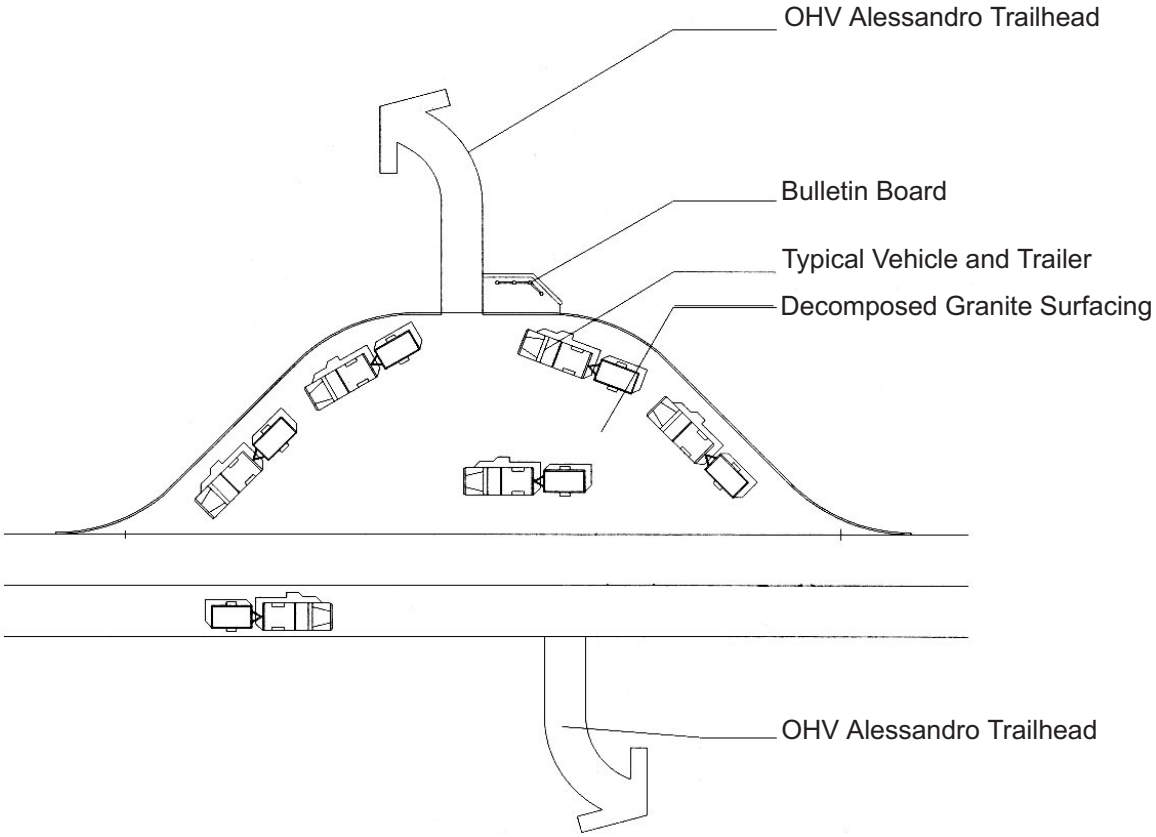
Conceptual Overlook



Conceptual OHV Alessandro Trailhead



Bautista Canyon - Conceptual Overlook and OHV Alessandro Trailhead Plans

FIGURE 2.2-5

GRAPHICS/Environmental/Bautista Canyon Road/Overlook_OHVa.FH8

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kiosk. The overlook area would be designed to meet Americans with Disabilities Act (ADA) standards.

2.2.1.7 Bautista Canyon Off-Highway Vehicle Alessandro Trailhead

A 0.1 ha (0.3 ac) trailhead pullout area is proposed for construction at the existing Alessandro Trail crossing located 0.7 km (0.4 mi) south of the northern terminus. The parking area is currently proposed to be surfaced with decomposed granite and sized to accommodate approximately five vehicles and trailers. A small informational bulletin board is also proposed. The Alessandro Trail is an OHV trail that links to other OHV trails in the SBNF (see Figure 2.2-5).

2.2.1.8 Abandoned Roadway Restoration

All abandoned sections of dirt roadway will be restored to produce natural topography and revegetated according to an approved Landscape and Revegetation Plan (see Section 3.6.5, and conceptual plan in Volume II, Appendix F).

2.2.2 Alternatives

2.2.2.1 Alternative A – 40 km/h (25 mph) Design Speed

Typical Section

The roadway would be paved for two lanes of traffic, one lane in each direction, with a pavement width of 7.8 m (26 ft) (see Figure 2.2-6). Each lane would be 3.3 m (11 ft) in width with a 0.6 m (2 ft) wide shoulder. The total length of this alternative is approximately 12.3 km (7.6 mi) (see Figures 2.2-1 through 2.2-3). The preliminary construction cost estimate for Alternative A is approximately $11.5 million.

Design Speed

The proposed design speed for Alternative A is 40 km/h (25 mph). Alternative A provides a 40 km/h alignment throughout the rolling to mountainous Segments 1 and 2, while matching the 55 km/h (35 mph) in the flatter Segment 3 due to the straight alignment of the existing roadway.

Excavation Estimates

Alternative A would require approximately 225,000 cubic meters (m^3) (294,300 cubic yards [yd^3]) of excavation and would result in 16.1 ha (39.8 ac) of new disturbance (see Table 2.2-2). The area of disturbance was calculated based on a right-of-way width of 12 m (40 ft) with additional area added to incorporate cut/fill slopes. Alternative A would result in cut and fill slopes up to 25 m (80 ft) in height.

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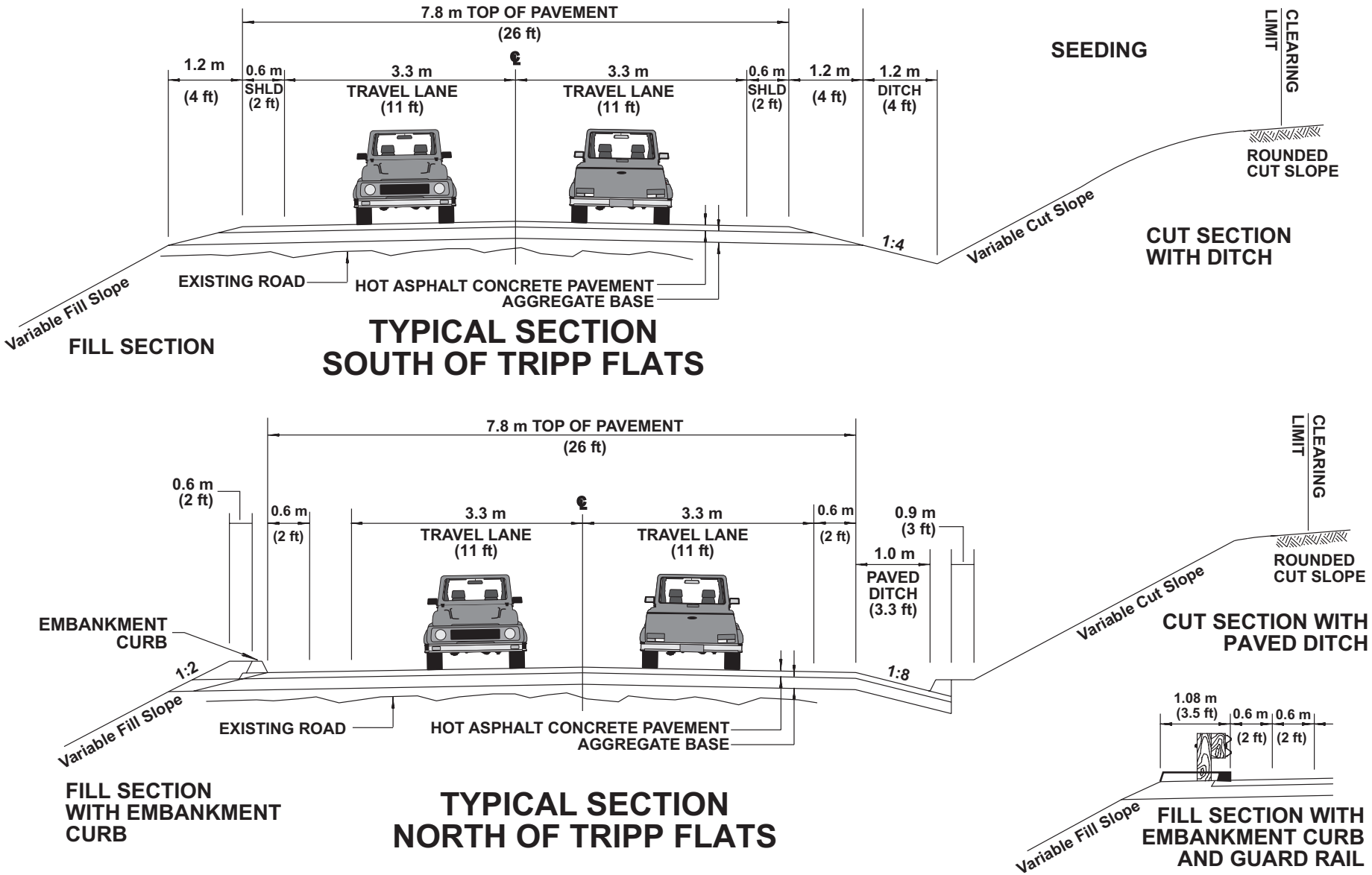

Typical Roadway Cross Sections

FIGURE
2.2-6

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Table 2.2-2
Summary of Principal Characteristics of Alternatives

Alternative	Length (kilometers /miles)	Disturbance within Existing Roadway (hectares/acres)	Total Area of New Disturbance* (hectares/acres)	Pavement Width (meters/feet)	Estimated Earthwork Required (cubic meters/ cubic yards)	Estimated Cost
A – 40 km/h (25 mph)	12.3 km (7.6 mi)	6.6 ha (16.3 ac)	16.1 ha (39.8 ac)	7.8 m (26 ft)	225,000 m^3 294,300 yd^3	$11.5 million
B – 55 km/h (35 mph)	12.1 km (7.5 mi)	5.5 ha (13.6 ac)	17.9 ha (44.2 ac)	7.8 m (26 ft)	303,000 m^3 396,300 yd^3	$13.3 million
C – 55/40/55 km/h (35/25/35 mph)	12.3 km (7.6 mi)	6.2 ha (15.3 ac)	16.6 ha (41.0 ac)	7.8 m (26 ft)	235,000 m^3 307,400 yd^3	$11.7 million
D – No Action	13.2 km (8.2 mi)	N/A	N/A	4.8 - 6.1 m (16 - 20 ft)	N/A	Continued maintenance costs

*Total area of disturbance was derived by subtracting the existing roadway area from the total proposed alternative grading area. The existing unpaved roadway segments not paved as part of project implementation would be revegetated.

ac – acres
ha – hectares
yd^3 – cubic yards
m^3 – cubic meters
ft – feet
m – meters
km/h – kilometers per hour
mph – miles per hour

2.2.2.2 Alternative B - 55 km/h (35 mph) Design Speed

Typical Section

The roadway would be paved for two lanes of traffic, one lane in each direction, with a pavement width of 7.8 m (26 ft) (see Figure 2.2-6). Each lane would be 3.3 m (11 ft) in width with a 0.6 m (2 ft) wide shoulder. The total length of this alternative is approximately 12.1 km (7.5 mi) (see Figures 2.2-1 through 2.2-3). The preliminary cost estimate to construct Alternative B is approximately $13.3 million.

Design Speed

The design speed proposed for Alternative B is 55 km/h (35 mph) throughout the project (see Figures 2.2-1 through 2.2-3).

Excavation Estimates

Alternative B would require approximately 303,000 m^3 (396,300 yd^3) of excavation and would result in 17.9 ha (44.2 ac) of new disturbance (see Table 2.2-2). Alternative B would result in cut and fill slopes of up to 25 m (80 ft) in height.

2.2.2.3 Alternative C – Combination 55/40/55 km/h (35/25/35 mph) Design Speed

Typical Section

The roadway would be paved for two lanes of traffic, one lane in each direction, with a pavement width of 7.8 m (26 ft) (see Figure 2.2-6). Each lane would be 3.3 m (11 ft) in width with a 0.6 m (2 ft) wide shoulder. The total length of this alternative is approximately 12.3 km (7.6 mi). The preliminary cost estimate to construct Alternative C is approximately $11.7 million.

Design Speed

Under Alternative C, the affected portion of Bautista Canyon Road was divided into three segments based on terrain. Design speeds were incorporated accordingly to maximize travel efficiency while minimizing resource disturbance. Alternative C would incorporate a 55 km/h (35 mph) design speed in Segments 1 and 3 where the terrain is flatter and 40 km/h (25 mph) along Segment 2 where the terrain is mountainous.

Excavation Estimates

Implementation of Alternative C would require approximately 235,000 m^3 (307,400 yd^3) of excavation and would result in 16.6 ha (41.0 ac) of new disturbance (see Table 2.2-2). Alternative C would result in cut and fill slopes up to 25 m (80 ft) in height.

2.2.2.4 Alternative D (No Action)

The No Action (No Project) alternative is characterized as a "no-build" alternative. Under this alternative, no road improvements are proposed and Bautista Canyon Road would not be paved or realigned. The existing road and traffic conditions along Bautista Canyon Road are expected

to worsen as traffic volumes increase. Current roadway maintenance would continue and adequate maintenance would become increasingly more expensive as the deficient aspects of the road remain unrepaired. Funding designated for the proposed action would be used on another Forest Highway project.

2.3 Alternatives Considered but Eliminated from Detailed Consideration

This section presents alternatives eliminated from detailed consideration. The alternatives discussed below were evaluated and found inadequate in terms of engineering design, traffic safety, or would result in unacceptable environmental impacts. Based on these findings, the alternatives were eliminated from further review.

2.3.1 Proposed Variations to Build Alternatives

Alternatives A, B, and C have undergone a review process to examine potential effects to biological, cultural, and other resources. Where practicable, these alternatives were revised to reflect more environmentally sensitive alignment variations within each alternative.

Ridge #1 Alignments: The existing roadway through this area descends into the drainage for Bautista Creek and crosses the creek with a low water crossing (see Figure 2.2-1). The existing alignment contains multiple sharp horizontal curves that could not accommodate the proposed design speeds.

Originally, there were two alignment alternatives at the Bautista Creek crossing (Ridge #1) in addition to the proposed alignment. One was a straight crossing that cut off the existing horseshoe alignment. This alignment bridged the creek drainage by continuing southeast where the existing road turns sharply to the north (the beginning of the "horseshoe") and then reconnected at the eastern end of the "horseshoe." In an effort to avoid impacts to wetlands, a second alignment (the "no bridge" alignment) was identified, which closely followed the existing alignment based on a 40 km/h (25 mph) design speed. The "no bridge" alignment shifted to the north, roughly following the existing alignment, and crossed Bautista Creek close to the existing crossing. The use of a culvert instead of a bridge was considered for this alignment due to the low profile. Preliminary review of these alignments indicated that each would result in unacceptable negative impacts to environmental resources. As a result, the proposed alignment was identified for this location and these early Ridge #1 alignments were eliminated from further review.

Ridge #2 Alignment: Ridge #2 is the location of another existing "horseshoe" curve that needs to be realigned to accommodate the 40 km/h (25 mph) design speed (see Figure 2.2-2). The original design followed the existing roadway alignment on the north side of the hill along Bautista Creek (the top of the "horseshoe"). This alignment impacted wetlands and had a negative impact on wildlife. To reduce these impacts, the proposed alignment at Ridge #2 was shifted to the south of the hill along a natural drainage channel grade, eliminating the impacts to the wetlands and other environmental resources. Consequently, the earlier Ridge #2 alignment was eliminated from analysis in the EIS/EIR.

2.3.2 Pave Existing Bautista Canyon Road

Paving the existing road alignment was considered but eliminated because it would not meet the project's objectives to improve safety and emergency access. The existing roadway was not engineered to current standards and is too narrow in several locations for vehicles to pass safely. Furthermore, basic roadway geometry is poor, with numerous sharp horizontal and vertical curves that limit sight distance. Additionally, roadway drainage is poor and road washouts and rockfalls caused by storm water runoff and seasonal flooding at the low-water crossings of Bautista Creek and other drainages would prevent use of the road during storm events. Paving the existing route would not be an appropriate use of federal funds because suitable design standards would not be achieved and it would not accomplish the purpose of or satisfy the need for the proposed project.

2.3.3 Reconstruct and No Pave

Implementation of this alternative would involve reconstructing the roadway to one of the build alternative standards; however, the surface would not be paved. This alternative was eliminated because it would result in equal direct environmental effects as the build alternatives and greater indirect effects resulting from the unpaved surface. This alternative would not adequately address maintenance needs because the unpaved surface would continue to require regular maintenance to maintain a safe, smooth driving surface. Thus, implementation of this alternative would not accomplish the purpose of or satisfy the need for the project.

2.3.4 New Route Using Existing Streets

A new route using roads such as SH 371 to SH 74 to the east or SH 371 to Wilson Valley Road/Sage Road/State Street to the west was considered. The existing traffic levels on Bautista Canyon Road are very low. At the Bautista Conservation Camp the traffic volume is only 88 vehicles per day on a Saturday, while at north end of the project east of Fairview Avenue the volume is 134 on the same day. This indicates that the through traffic volume is very low. Because taking the alternate route (using State Highways 74/371) is already faster than the existing road, and the very low volume of traffic of Bautista Canyon Road, it is reasonable to assume that all or virtually all of the traffic on Bautista Canyon Road is there for recreation or sightseeing rather than through traffic. Therefore, it is unlikely that implementing the New Route Using Existing Streets Alternative would take any traffic off Bautista Canyon Road. This alternative was eliminated from further consideration because it would not improve access to the SBNF or provide a more efficient link between Valle Vista and Anza.

2.3.5 New Route Through Bautista Canyon

A completely new alignment through Bautista Canyon was considered. This alternative was eliminated because construction of a new road would have greater environmental effects than those projected for reconstruction of the existing Bautista Canyon Road. Additionally, the SBNF opposed implementation of this alternative. Table 2.2-2 shows the amount of existing roadway that is being utilized and the total amount of new disturbance from each of the build alternatives. A new route through Bautista Canyon would result in a significant increase in new disturbance

over the build alternatives considered in this EIS/EIR, amplifying the potential for significant environmental effects.

2.3.6 25 or 32 km/h (15 or 20 mph) Design Speed for Entire Route

A 25 or 32 km/h (15 or 20 mph) design speed for Bautista Canyon Road was considered but eliminated after review of established design standards because the projected traffic volumes would be too high for this slow of a design speed. Projected traffic volumes indicate a rural collector classification, which requires design speeds of 40-48 km/h (25-30 mph). Furthermore, environmental impacts would be similar to those identified for the proposed action due to the similarity in design criteria and the required curve widening needed to accommodate vehicles tracking around the sharper curves of a slower design speed. Therefore, no advantage (environmental or otherwise) would be realized by selecting this alternative.

2.3.7 Alternative Transit

Alternative means of transit were considered and eliminated from further consideration because of the remote location and the lack of connectivity to other existing mass transit facilities. Additionally, current deficiencies make this unusable as a transit route. As such, transit or other modes of transportation would not meet project objectives, including the provision of a safe vehicle travel route and improved access for emergency vehicles.

2.3.8 Limited Access Alternative

Bautista Canyon Road would be limited to Forest Service access and Native American plant collection from just south of the Conservation camp to just north of Tripp Flats Road. Cul-de-sacs would be constructed at these locations along with access gates. The Forest Service would control the gates at these locations and would coordinate with the Native Americans concerning their access. Alternative routes, SH 74 to SH 371 and/or State Street to Sage Road, would be improved to handle the additional traffic volume diverted from Bautista Canyon Road. The degree of improvements to these roadways would be determined based on the existing roadway's ability to handle the additional traffic. This alternative was eliminated from further review because it would remove a transportation link in the County's circulation system which is inconsistent with the County's General Plan, specifically with REMAP policy 8.1 and 8.7; it would remove one potential access route out of the Anza Valley in the event of a fire; it would not provide an improved road surface that would allow for faster travel by fire-fighting equipment, improved access by Forest Service enforcement vehicles, and County Sheriff vehicles; it would not allow the public to travel by automobile through a portion of the SBNF (that had been available and planned for such use); it would not allow access to the existing Alessandro Trail; and improvements to SR 74/SR 371 and/or State Street/Sage Road would have potentially significant environmental impacts which would have to be addressed.

2.4 Project Construction

Although the build alternatives (A, B and C) have different alignments, they each have similar design components and construction requirements. These requirements are described below

and include surveying, site preparation, bridge construction, grading, paving, installation of drainage facilities, culverts, guardrails, signing, and revegetation.

2.4.1 Construction Schedule

Construction improvements are estimated to require 16 months to complete. Project construction could occur up to 7 days per week for 24 hours per day, but it is more likely the contractor would work Monday through Friday from 6:00 a.m. to 7:00 p.m. A workforce of approximately 20 to 25 personnel would be on-site during a typical workday. In addition to the construction workforce, biological and cultural resource monitor(s) would be on-site during various phases of project construction. The number of workers and duration of their responsibilities is unknown.

During construction, the 8.8 km (5.5 mi) segment between the northern terminus and Tripp Flats Road would be closed to public through traffic. Emergency access would be maintained at all times. Access to Tripp Flats Road would be provided via Carey Road. Bautista Canyon Road would be closed for two 4-hour periods each workday between Tripp Flats Road and Howard Road [located approximately 1.9 km (1.2 mi) north of the southern terminus]. The closures would occur between 8:00 a.m. and 12:00 noon, and from 1:00 p.m. to 5:00 p.m. It is anticipated that 30-minute traffic delays would occur from Howard Road to the southern terminus.

2.4.2 Access and Construction Staging Areas

2.4.2.1 Ingress and Egress

Ingress and egress of construction vehicles would most likely occur from the north through Valle Vista. The number of construction personnel accessing the construction site would vary depending on the construction activities. The average number of personnel vehicle round trips to and from the construction site is estimated to be 50 per day. The number of trucks carrying material and equipment to the site would vary based on the activity. During grading, few materials would be needed; thus, truck traffic would be minimal. As many as 120 truck round trips per day could be required during activities such as aggregate placement and paving. It is anticipated that construction materials, such as aggregate base, concrete, asphalt, and guardrails would be delivered from more populated areas to the north in Riverside and San Bernardino Counties, though specific locations are unknown at this time.

2.4.2.2 Staging Areas

Within the SBNF, staging areas would be located in disturbed areas along the project corridor. With owner permission, the contractor may locate staging areas on private property outside of the SBNF. Staging areas are typically used for construction field trailers, temporary restroom facilities, and storage of construction materials. It is anticipated that aggregate, asphalt, sand, and slurry materials would be stored by local suppliers off-site until these materials are needed for construction. Construction equipment would typically be left overnight at the work areas.

2.4.3 Construction Sequence

Construction equipment used on-site would include various types of trucks (e.g., pickup, dump, water, flat-bed, and concrete mixer) bulldozers, backhoes, excavators, front-end loaders, scrapers, compactors, motor graders, pavers, rollers, power brooms, and diesel-powered electric generators.

2.4.3.1 Site Preparation (Clearing and Grubbing), Excavation, Blasting, and Grading

Site preparation would involve staking, clearing of existing vegetation, hard rock blasting, grading, and spoil removal. Excavation volumes would vary depending upon the alternative and would range from 225,000 m^3 (294,300 yd^3) to 303,000 m^3 (396,300 yd^3) as shown on Table 2.2-1. Cut and fill material would be balanced on-site, thus minimizing truck trips and off-site disposal requirements.

2.4.3.2 Utility Relocation

During site preparation, existing power and fiber-optic cable would need to be relocated. A total of seven power poles owned by the Anza Electrical Cooperative would be relocated outside of the proposed roadway clear zone. This would require an amendment to the existing SBNF Special Use Permit (see Figures 2.2-1 through 2.2-3 for approximate locations). Construction would also require relocation of a fiber-optic cable, which is buried adjacent to the exiting road corridor. Suitable areas to place vaults and manholes would be recommended by the FHWA and coordinated with affected utility companies. Relocation would occur as part of the construction sequence, and thus, would not result in additional disturbance.

2.4.3.3 Aggregate Base Placement

A new crushed aggregate base would be placed and compacted over the prepared subgrade. Guardrail posts would be placed during this phase of construction (see Figure 2.2-6).

2.4.3.4 Asphalt Concrete Pavement

A leveling layer of hot asphalt concrete pavement and an asphalt concrete overlay would be placed and compacted over the aggregate base (see Figure 2.2-6).

2.4.3.5 Revegetation

All disturbed areas, including sections of the existing alignment not abandoned, and all cut slopes in alluvium soil [1(V):1(H) maximum], or fill slopes [1(V):1.5(H) maximum] would be seeded, and/or planted with container specimens, of species native to Bautista Canyon. The FHWA has developed a Conceptual Landscape and Revegetation Plan (Volume II, Appendix F) that would be finalized and approved by the Lead Agencies prior to project implementation.

2.4.3.6 Guardrails

Guardrails would be installed in areas where roadside safety concerns have been identified. These areas are defined as those where road conditions are hazardous compared to the overall roadway characteristics and where the conditions represent a greater safety risk than what drivers may encounter on other segments of the road. These may include changes in roadside

topography, curves, and large culvert headwalls. Guardrails would be built using weathered steel (rust colored) to reduce their visual impact.

2.4.3.7 Signing

As noted in Section 2.2.1.2, speed limit signs would be installed along the newly paved segment of road consistent with a signage plan prepared by the County of Riverside. The signage plan would specify speed, identification, and safety signage to be installed along the roadway. At a minimum, the County would install 35 mph limit signs for both the northbound and southbound direction where the design speed of the road is 35 mph (55 km/h). Subsequent to the 35 mph speed limit signs, curve warning signs with appropriate advisory speed limit signs would be installed at selected curves based on a field review after the construction of the road is completed. Curve warning signs with appropriate advisory speed limit signs would be used for the portion with 25 mph (40 km/h) design speed.

2.4.3.8 Crossing Guard Service for Valle Vista Elementary School

During project construction, there may be periods when construction traffic through the intersection of Fairview and Mayberry Avenues, near Valle Vista Elementary School, is particularly high. The contractor retained by FHWA to construct the project would be required, as part of the construction traffic management plan, to provide a crossing guard at this intersection, which is currently controlled by all-way stop signs. The contractor would be required to coordinate with the Principal of Valle Vista Elementary on the deployment of the crossing guard and to inform the Principal of any construction activities that may affect the intersection. The County of Riverside would inform the school of the planned construction schedule.

2.4.3.9 Waste Materials

All hazardous materials (e.g., fuel, oil, and lubricants) and wastes would be stored on-site and properly disposed of in accordance with County standards. Other wastes such as culvert pipe, rock excavation, or other solid materials would be stored on-site and disposed of according to local and state law. The construction contractor would provide an appropriate number of portable, on-site sanitation facilities (i.e., portable restrooms) consistent with state, federal, and local requirements. These facilities would be regularly maintained by disposing of wastes off-site in appropriate sewage treatment systems, and all such facilities would be removed after construction is completed. Per County specifications, the contractor would be required to separate work areas, including material sources, by the use of a dike or other suitable barrier that prevents sediment, petroleum products, chemicals, or other liquid or solid materials from entering drainages or water bodies.

2.4.3.10 Monitoring

In addition to the construction workforce, biological and cultural resource monitor(s) would be present on-site during various phases of construction, as needed. The monitor(s) would be responsible for ensuring mitigation commitments are implemented and that unexpected or inadvertent effects to cultural resources or sensitive biological resources do not occur during construction. A monitoring plan including identification of sensitive species and resources potentially occurring in the project areas would be developed prior to project initiation.